Service Manual for

DT-700 (PX-790)

DT-760 I/O Box (PX-905)

Date: July 1995

DT-710 (PX-797)

Date: February 1997

DT-700

DT-710

DT-760

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1. Specification

CPU 32 bit RISC CPU

RAM 512K byte / 1M byte

Display

Type:	FSTN semi-transparent LCD		
Resolution:	96 X 48 dots		
Font sizes / screen:			
6 dots mode:	ANK:	6 X 7 dots	16 Columns X 4 Lines
	Normal:	6 X 12 dots	16 Columns X 8 Lines
	Double:	12 X 12 dots	8 Columns X 4 Lines
8 dots mode:	ANK:	8 X 8 dots	12 Columns X 6 Lines
	Normal:	8 X 16 dots	12 Columns X 3 Lines
	Double:	16 X 16 dots	6 Columns X 3 Lines
Indication character type:	ANK, Kanji character, JIS first & second standard, 129 of Optional character		
Back light:	LED		
Contrast:	16 phases by Electronic volume		

Scanner

System:	Semiconductor laser
Wavelength:	Approx. 670 nm
light output:	J.I.S. Class 2 laser
Scanning Speed:	100 scan/sec.
Resolution:	0.15 mm (Min.)
Readable PCS:	More than 0.45 (more than 51% of reflection rate for space & margin)
Readable range:	0 to 380mm(as of 1.0 mm of the resolution ability)
Readable bar code width:	Direct contact: 65mm (max) From 380 mm: 250 mm (max)
Activity luminance:	3,000 Lux ~ 8,000 Lux
Readable code:	WPC, NW7, CODE39, ITF, CODE93, CODE128, MSI
Confirmation:	One 2-color LED

Number of keys

	DT700 (Ten)	**DT710(Full)**
Input key:	11	18
Control key:	6 (Included readable Trigger & power Key)	
Function key:	8 (F1~F8)	

External Interface

Type:	Serial (14-3 pin cable: FP-120, FA-50) 14-14 pin cable: DT-700 14-9 pin cable: DT-9000
Speed:	150 k bps (Between H/Ts units) 1200 bps to 190.2 Kbps

Optical Interface

Type:	Infrared	Casio original protocol
Speed:	1,200 bps to 19.2 k bps (maximum)	

Main power supply Two AA-size alkaline batteries

Memory backup One CR2032 battery

Low power warning Separate warnings for main and back up power supplies.

Low power function Resume sleep mode

Operating duration Approximately 100 hours of intermittent operation

Dimensions Approximately 174(L) X 58.8(W) X 25.4(H) mm

Weight Approximately 190 g

Environmental data

Drop durability:	1 m
Operating temperature:	-5 to 50 Centigrade temperature
Water standard:	Conforms with IPXII

Soft ware

Basic data collection	Casio data entry tool (for parameter setting by editor
Copiler	SHC (Hitachi)

M. T. B. F.

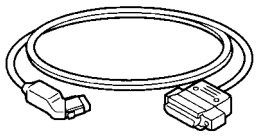
Stroke key:	over 300,000 times
14 pin connector:	over 5,000 times
Battery cover:	over 5,000 times
Scanner:	over 5,000 hours

Model	M20E	512 KB
	M30E	1.0 MB

2. Option

1) Cable

DT-782/783RSC



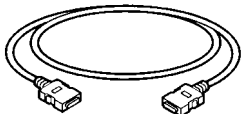
DT-782RSC (Cross cable)

(14 pin)			(25 pin male)	
Signal	Pin		Pin	Signal
FG	1		1	FG
SD	3		2	SD
RD	5		3	RD
RS	7		4	RS
CS	9		5	CS
CD	13		8	CD
ER	8		20	ER
DR	11		6	DR
SG	14		7	SG
FG	case		1	FG

DT-783RSC (Cross cable)

(14 pin)			(25 pin female)	
Signal	Pin		Pin	Signal
FG	1		1	FG
SD	3		2	SD
RD	5		3	RD
RS	7		4	RS
CS	9		5	CS
CD	13		8	CD
ER	8		20	ER
DR	11		6	DR
SG	14		7	SG
FG	case		1	FG

DT-786RSC(Bt DT-700 & DT-700)

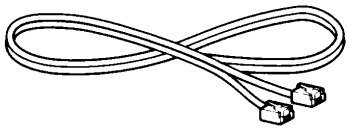


(14 pin)			(14 pin)	
Signal	Pin		Pin	Signal
CMOS SD	5		5	CMOS SD
CMOS RD	10		10	CMOS RD
CMOS RS	4		4	CMOS RS
CMOS CS	8		8	CMOS CS
CMOS CD	9		9	CMOS CD
CMOS ER	3		3	CMOS ER
CMOS DR	7		7	CMOS DR
GND	6		6	GND
GND	11		11	GND
GND	14		14	GND
FG	shield		shield	FG

DT-787AX(Cross)

(14 pin)			(9 pin female)	
Signal	Pin		Pin	Signal
FG	1		case	FG
SD	3		3	SD
RD	5		2	RD
RS	7		7	RS
CS	9		8	CS
CD	13		1	CD
ER	8		4	ER
DR	11		6	DR
SG	14		5	GND
FG	case		case	FG

DT-788RSC(6-6pin Modular cable)



Signal	Pin		Pin	Signal
TRUE(INVERT)	3		3	TRUE(INVERT)
INVERT(TRUE)	4		4	INVERT(TRUE)

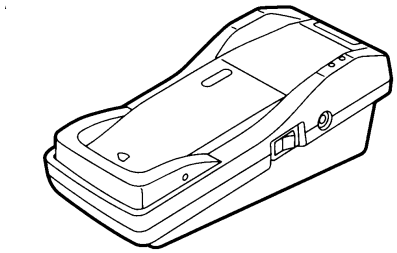
LVC-71
Level converter straight cable (14 pin - 25 pin Male)
LVC-72
Level converter cross cable (14 pin -25 pin Female)

Carrying Case
DT-70CASE-01

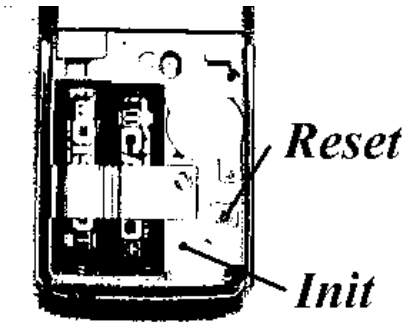
AC Adaptors

DT-9020ADOG (230 V)
DT-9020ADPU (120 V)

2) I/O box DT-760 IOE (PX-905)



3. Mac operation



3-1. Reset key

In power off:	Reset flag and NMI is going to be on. Initialization of Hardware.
In Power on:	Compulsion electric power supply off This switch is covered by filler.

3-2. Boot switch

4--2-1. Init key
Electric power supply ON is done with compulsion menu boot from OFF status.
Even electric power supply ON status does compulsion menu boot.
In reset operation, invalid.

4-2-2. PW key
It boots with hardware suppress.

3-3. The other switch

4-3-1. Battery lid switch
When battery cover is opened, power supply is off.

3-4. The detection of battery consumption

Power supply	Level	Description	Voltage	Handling of Hardware
Main Battery	Replacement battery voltage	LB1	2.1 V	IRQ6 (INT3)
	Operating limits voltage	LB0	1.6 V	NMI
Sub Battery	Replacement battery voltage	LB2	2.6 V	IRQ6 (INT3)
Back-up Voltage	Back-up limits voltage	LB-1	2.0 V	Flag reset, RTC

Note: In LB°1 status, there is the possibility that memory and resistor could be destroyed.

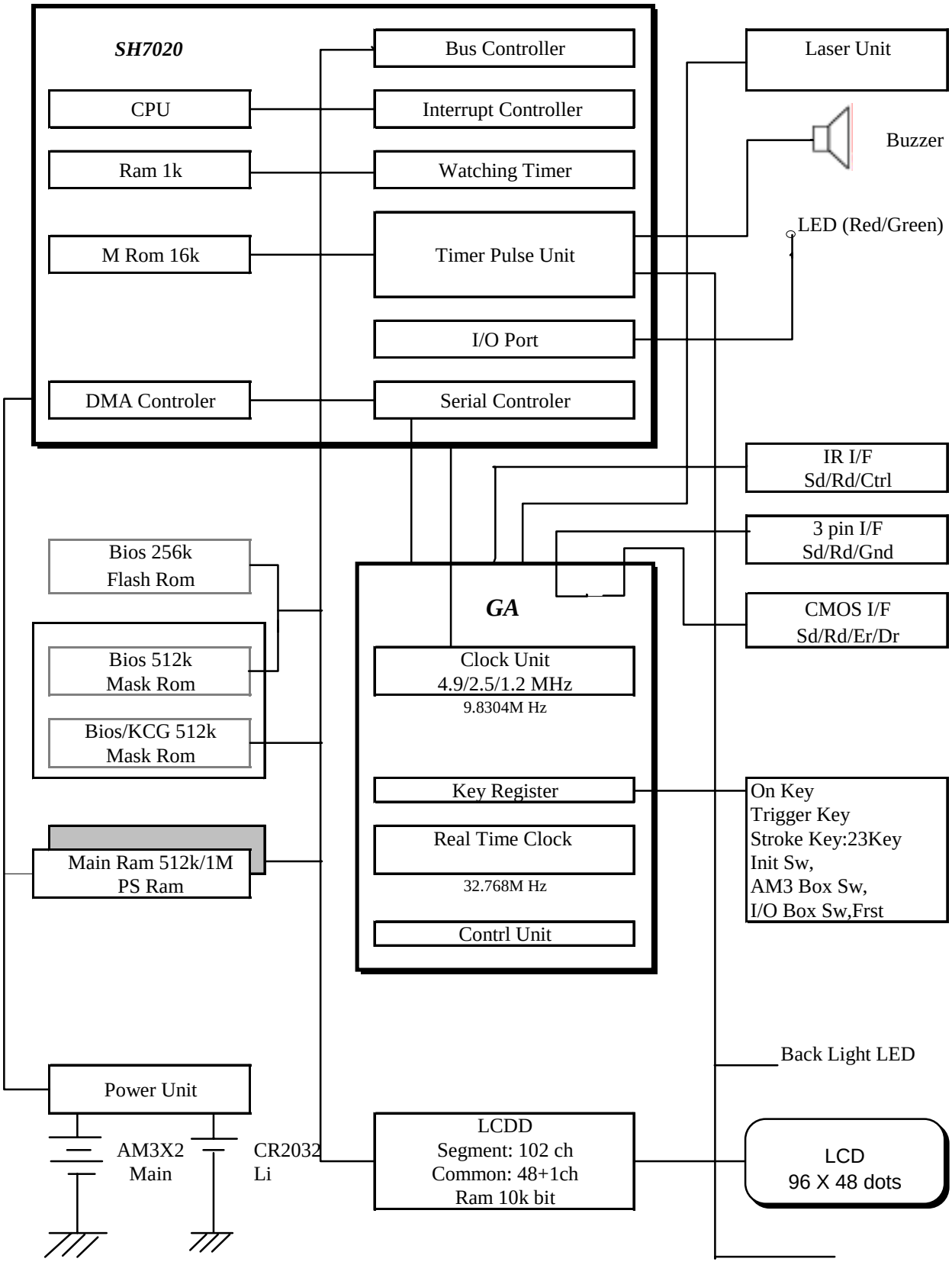
4. Main components

CPU	HD6437020U01X	32 bit RISC CPU
ROM	E28F200BL-B150	(Flash ROM)
	MB838200BLPF TN-12A	(Mask ROM)
RAM	HM65W8512L	PS-RAM 512kb/1mMb
Gate array	SLA912SF3S	
LCD	FSTN semi-transparent LCD	96 X 48 dots
Scanner	VLM-1600	Semiconductor laser

External Interface

Infrared ray:	DT-760 I/O
14-3 pin cable:	FP-120, FA-50
14-14 pin cable:	DT-700
14-9 pin cable:	DT-9000

5. Block Diagram



CPU (HD6437020U01X) Pin Description

No.	Signal	In/Out	Description	No.	Signal	In/Out	Description
1	AD0	In/Out	Data bus	51	(CS4)	Out	Chip select 4
2	AD1	In/Out	Data bus	52	(RAS)	Out	Low address strobe
3	AD2	In/Out	Data bus	52	(CS5)	Out	Chip select 5
4	Vss	In	Gnd	53	(CS6)	Out	Chip select 6
5	AD3	In/Out	Data bus	54	(WAIT)	In	Wait
6	AD4	In/Out	Data bus	55	(WR)	Out	Write
7	AD5	In/Out	Data bus	56	(PA5)	Out	Gnd
8	AD6	In/Out	Data bus	57	(RD)	Out	Read
9	AD7	In/Out	Data bus	58	(BACK)	Out	Acknowledge of Bus right Request
10	AD8	In/Out	Data bus	59	Vss	In	Gnd
11	AD9	In/Out	Data bus	60	(BREQ)	In	Bus right Request
12	AD10	In/Out	Data bus	61	(IRQOUT)	Out	IRQ Request
13	Vcc	In	Power	62	DPL	In/Out	Parity for D7 ~ D0
14	AD11	In/Out	Data bus	63	Vcc	In	Power
15	Vss	In	Gnd	64	DPH	In/Out	Parity for D15 ~ D8
16	AD12	In/Out	Data bus	65	(IRQ0)	In	IRQ Request
17	AD13	In/Out	Data bus	66	(IRQ1)	In	IRQ Request
18	AD14	In/Out	Data bus	67	(IRQ2)	In	IRQ Request
19	AD15	In/Out	Data bus	68	(IRQ3)	In	IRQ Request
20	A0	Out	Address bus	69	CK	Out	System clock
21	A1	Out	Address bus	70	Vss	In	Gnd
22	A2	Out	Address bus	71	EXTAL	In	Exterior clock
23	A3	Out	Address bus	72	XTAL	In	Crystal oscillator
24	Vss	In	Gnd	73	Vcc	In	Power
25	A4	Out	Address bus	75	(WDTOVF)	Out	Watch dog timer over flow
26	A5	Out	Address bus	76	(RES)	In	Reset
27	A6	Out	Address bus	77	MD0	In	Mode
28	A7	Out	Address bus	78	MD1	In	Mode
29	A8	Out	Address bus	79	MD2	In	Mode
30	A9	Out	Address bus	80	Vcc	In	Power
31	A10	Out	Address bus	81	Vss	In	Gnd
32	Vss	In	Gnd	82	Vss	In	Gnd
33	A11	Out	Address bus	83	TIOCA2	In/Out	In/Out compare (Ch 2)
34	A12	Out	Address bus	84	TCOCB2	In/Out	In/Out compare (Ch 2)
35	A13	Out	Address bus	85	TIOCA3	In/Out	In/Out compare (Ch 3)
36	A14	Out	Address bus	86	TCOCB3	In/Out	In/Out compare (Ch 3)
37	A15	Out	Address bus	87	TIOCA4	In/Out	In/Out compare (Ch 4)
38	Vcc	In	Power	88	Vcc	In	Power
39	A16	Out	Address bus	89	TCOCB4	In/Out	In/Out compare (Ch 4)
40	A17	Out	Address bus	90	TCLKC	In	ITU Timer clock
41	Vss	In	Gnd	91	TCLKD	In	ITU Timer clock
42	A18	Out	Address bus	92	Vss	In	Gnd
43	A19	Out	Address bus	93	RxD0	In	Receiving data
44	A20	Out	Address bus	94	TxD0	Out	Sending data
45	A21	Out	Address bus	95	RxD1	In	Receiving data
46	(CS0)	Out	Chip select 0	96	TxD1	Out	Sending data
47	(CS1)	Out	Chip select 1	97	(IRQ4)	In	IRQ Request
48	(CS2)	Out	Chip select 2	98	(IRQ5)	In	IRQ Request
49	(CS3)	Out	Chip select 3	99	(IRQ6)	In	IRQ Request
50	Vss	In	Gnd	100	(IRQ7)	In	IRQ Request

Gate array (SLA912SF3S) Pin Description

No.	Signal	In/Out	Description	No.	Signal	In/Out	Description
1	A4	In	Address bank	65	TEST1	In	Test
2	A3	In	Address bank	66	TEST2	In	Test
3	A2	In	Address bank	67	TEST3	In	Test
4	A1	In	Address bank	68	FSET	In	F-Set
5	A0	In	Address bank	69	FVEC	In	V-Vec
6	VSS1	In	Power	70	(V50ON)	Out	50V on
7	AD7	In/Out	Address bus	71	VSS1	In	Power
8	AD6	In/Out	Address bus	72	(POE1)	Out	Refresh
9	AD5	In/Out	Address bus	73	(POE0)	Out	Refresh
10	AD4	In/Out	Address bus	74	(PWE)	Out	Write enable
11	AD3	In/Out	Address bus	75	(PCS1)	Out	Chip select
12	AD2	In/Out	Address bus	76	(PCS0)	Out	Chip select
13	AD1	In/Out	Address bus	77	Laser	Out	Laser
14	AD0	In/Out	Address bus	78	LSRSIG	IN	L-signal
15	Vss1	In	Power	79	(LZON)	Out	Laser on
16	IRQ7	Out	IRQ request	80	GAIN	Out	L-gain
17	IRQ6	Out	IRQ request	81	LSRTIM	In	L-timer
18	IRQ5	Out	IRQ request	82	VSS1	In	Power
19	IRQ4	Out	IRQ request	83	BATSW	In	Battery switch
20	(MCS)	Out	Chip select	84	(PWIR)	Out	Infrared ray power
21	(RD)	In	Read	85	IRCTR	Out	Infrared ray control
22	(PWD)	Out	Power down	86	(INIT)	In	Initial
23	RES1	In/Out	Reset	87	(HOLON)	Out	Hold
24	(FWE)	Out	Write enable	88	IOBOX	In	Hole
25	(FOE)	Out	Output enable	89	FRST	In	Reset
26	(CS3)	In	Chip select	90	KX4	In/Out	Key common
27	(CS2)	In	Chip select	91	KX3	In/Out	Key common
28	(CS1)	In	Chip select	92	KX2	In/Out	Key common
29	VDD1	In	Power	93	KX1	In/Out	Key common
30	(CS0)	In	Chip select	94	KX0	In/Out	Key common
31	(WAIT)	In	Waiting	95	VDD1	In	Power
32	(CS6)	In	Chip select	96	(ONKEY)	In	On
33	(WR)	In	Write	97	IX10M	In	Crystal oscillator
34	IRQ0	Out	IRQ request	98	OX10M	Out	Crystal oscillator
35	IRQ1	Out	IRQ request	99	VSS1	In	Power
36	IRQ2	Out	IRQ request	100	(TRIG)	In	Trigger
37	IRQ3	Out	IRQ request	101	KY5	In/Out	key
38	NMI	Out	NMI request	102	KY4	In/Out	key
39	(RXD1)	Out	Receiving data	103	KY3	In/Out	key
40	TCLK	Out	Clock	104	KY2	In/Out	key
41	VSS1	In	Power	105	KY1	In/Out	key
42	SCLK	Out	Clock	106	KY0	In/Out	key
43	SCLKI	In	Clock	107	BLL	Out	Back light
44	(TXD1)	In	Sending data	108	BLR	Out	Back light
45	TCA2	In/Out	In/Out compare (Ch 2)	109	(LCDWE)	Out	LCD W/E
46	(LBM1)	In	Low battery	110	(CRST)	Out	CPU reset
47	(V12ON)	Out	12V on	111	VSS1	In	Power
48	BATDMY	Out	Battery	112	A19	In	Address
49	LLIDMY	Out	Lithium Battery	113	A18	In	Address
50	(LB1)	In	Low battery 1	114	A17	In	Address
51	(LB0)	In	Low battery 0	115	A16	In	Address
52	LB2	In	Low battery 2	116	A15	In	Address
53	(V33ON)	Out	33V on	117	A14	In	Address
54	(PWCMS)	Out	Power 3P	118	A13	In	Address

No.	Signal	In/Out	Description	No.	Signal	In/Out	Description
55	CMSSD	Out	CMOS S-Data	119	TEST4	In	Test
56	VDD1	In	Power	120	A12	In	Address
57	CMSRD	In	CMOS R-Data	121	A11	In	Address
58	(PW3P)	Out	Power 3P	122	A10	In	Address
59	3PSD	Out	3P S-Data	123	A9	In	Address
60	3PRD	In	3P R-Data	124	A8	In	Address
61	(FRST)	In	Reset	125	A7	In	Address
62	VSS1	In	Power	126	VDD1	In	Power
63	IX32K	In	Crystal oscillator	127	A6	In	Address
64	OX32K	Out	Crystal oscillator	128	A5	In	Address

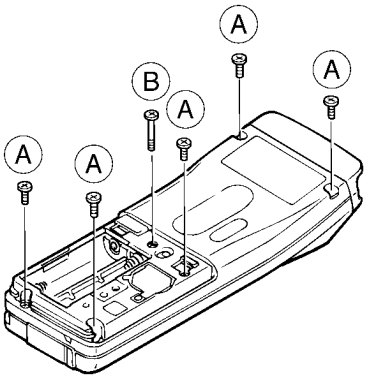
6. Disassembly and Assembly

6-1. Disassembly and Attachment of Upper and Lower Case

1) Remove the main batteries (SUM3 alkaline batteries x 2) and lithium battery (CR2032 x 1). (Refer to the "Instruction Manual" for the removal procedure.)

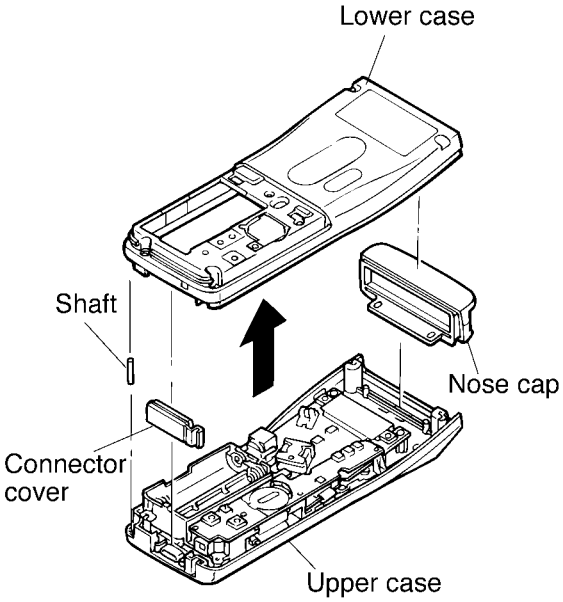
2) Remove the five flat screws (2 x 5 Ni) (A in diagram at right).

3) Remove the single long screw (2 x 15 Ni) (B in diagram at right).



4) Separate the bottom case from the upper case by lifting it up from the upper case.
The nose cap, connector cover and shaft can also be removed at this time. However, remove the nose cap carefully since it may be difficult to remove as a result of being adhered to the upper case with double-sided adhesive tape.

5) Attachment is performed by following the reverse procedure of removal.

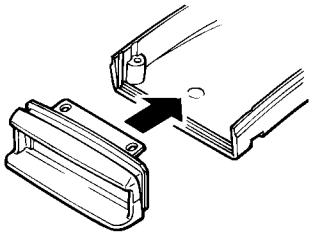


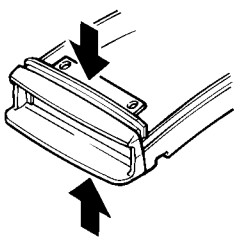
Nose Cap Attachment Method.

First, attach the nose cap to the bottom case.

1) Fit the nose cap on the front of the bottom case.

2) Push up and down to align the surfaces.

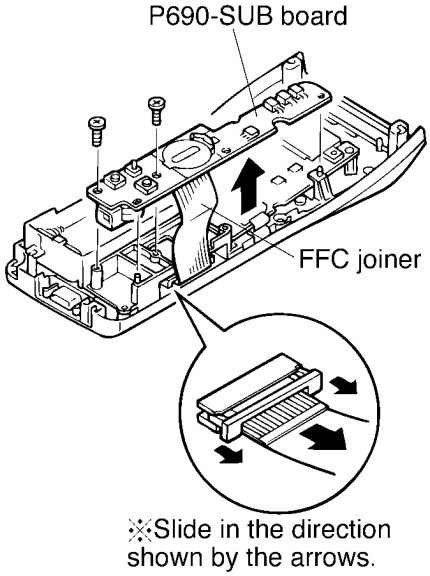




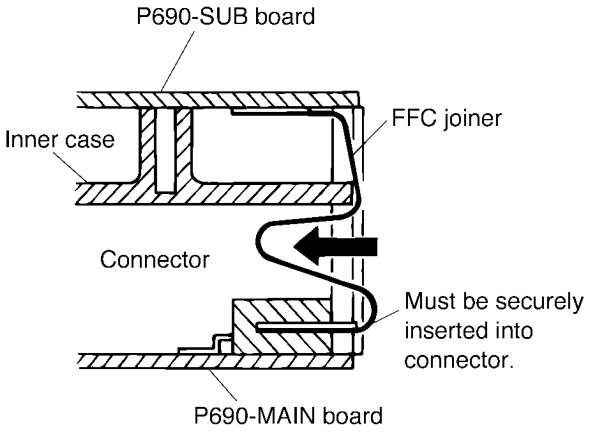
6-2. Attachment and Removal of P690-SUB Board

1) Remove the two flat screws (2 x 3.5) and raise up the P690-SUB board.

2) Disconnect the FFC joiner of the P690-SUB board from the connector. First, slide the connector opening with a tweezers or similar tool and then pull out the joiner after loosening the opening.



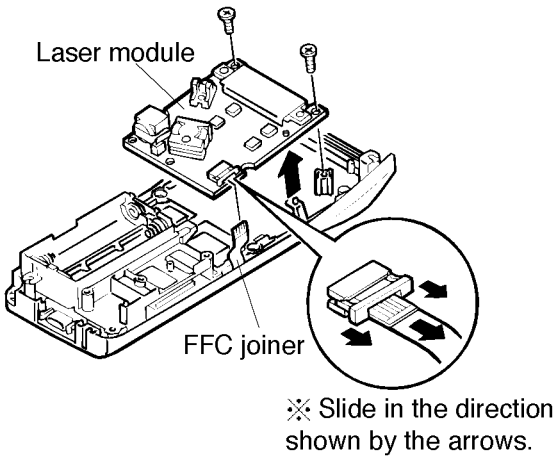
3) Attachment is performed by following the reverse procedure of removal. Push in the FFC joiner into the space above the connector while making sure it does not become pinched between the upper case and lower case.



6-3. Removal and Attachment of Laser Module

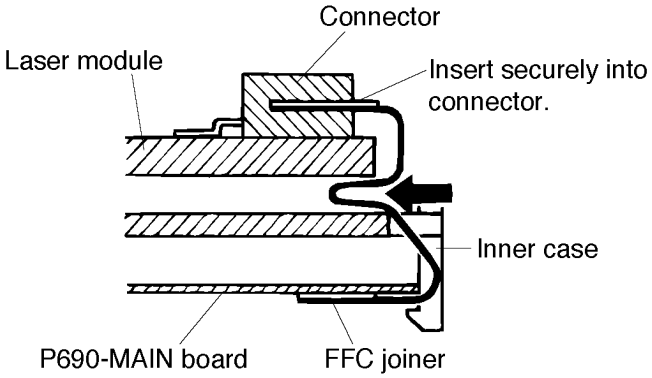
1) Remove the FFC joiner from the P690-MAIN board by means of the connector above the laser module. First, slide the connector opening with a tweezers or similar tool, and then pull out the joiner after loosening the opening.

2) Remove the two flat screws (2 x 5 Ni) and then remove the laser module.



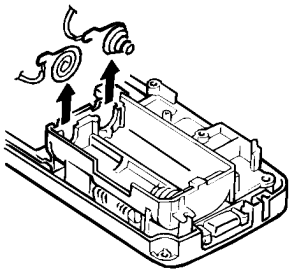
3) Attachment is performed by following the reverse procedure of removal. Insert the FFC joiner into the space below the laser module while making sure it does not become pinched between the upper case and lower case.

* Do not touch the screw adjustment above the laser module!



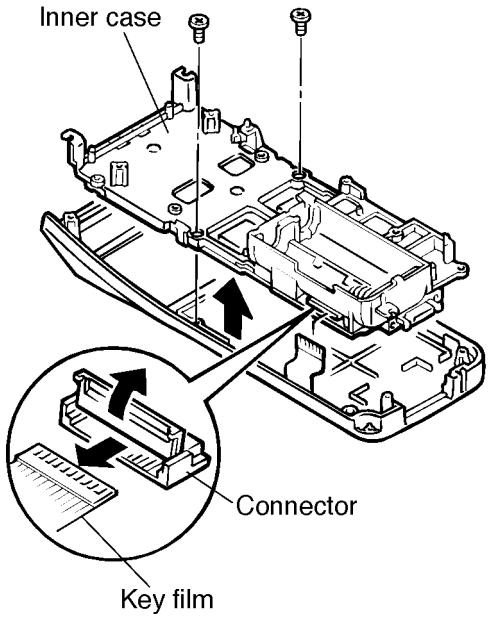
6-4. Removal and Attachment of P690-MAIN Board

1) Raise out the two main battery springs on the side on which the lead is connected.



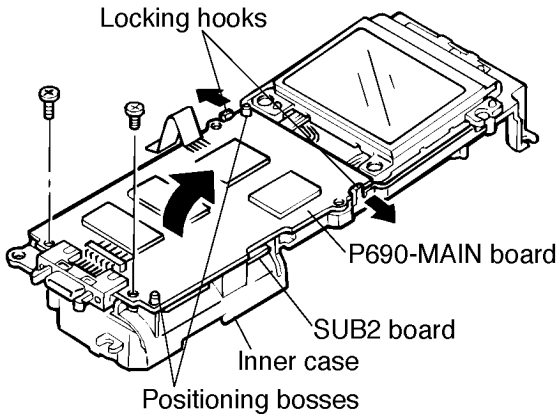
2) Remove the two flat screws (2 x 5 Ni) and separate the inner case from the upper case for both the MAIN board and LCD. However, remove the LCD carefully since it is difficult to remove as a result of the periphery being adhered to the upper case with double-sided adhesive tape.

3) Remove the key film connected to the P690-MAIN board from the connector. The key film is removed by opening the connector opening (dark brown portion) upward.



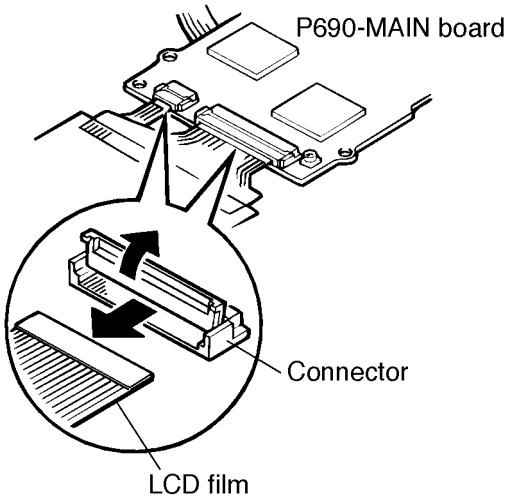
4) Remove the two flat screws (2 x 3.5).

5) Stand up the P690-MAIN board while disconnecting the locking hooks (see diagram at right). However, perform this procedure carefully since an auxiliary SUB2 board is connected to the old MAIN board, and that auxiliary SUB2 board is difficult to remove as a result of being adhered to the inner case with double-sided adhesive tape.



6) Remove the LCD film from the two connectors on the back side of the P690-MAIN board. The LCD film is removed by opening the connector opening (dark brown portion) upward.

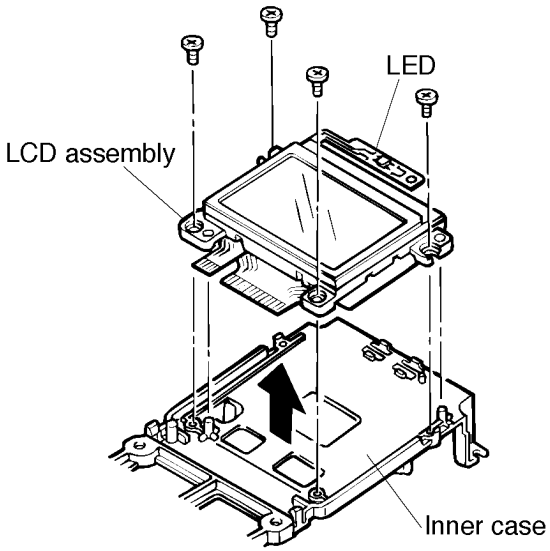
7) Attachment is performed by following the reverse procedure of removal. When connecting the LCD film to the MAIN board connector, it is easier to also separate the LCD assembly from the inner case. (Refer to section 5 below for the procedure for removing the LCD assembly.)



6-5. Removal and Attachment of LCD Assembly

1) Remove the four flat screws (2 x 3.5) and then remove the LCD assembly from the inner case.

2) Attachment is performed by following the reverse procedure of removal. The film of the LED portion is securely fit into the tabs at four locations on the inner case.

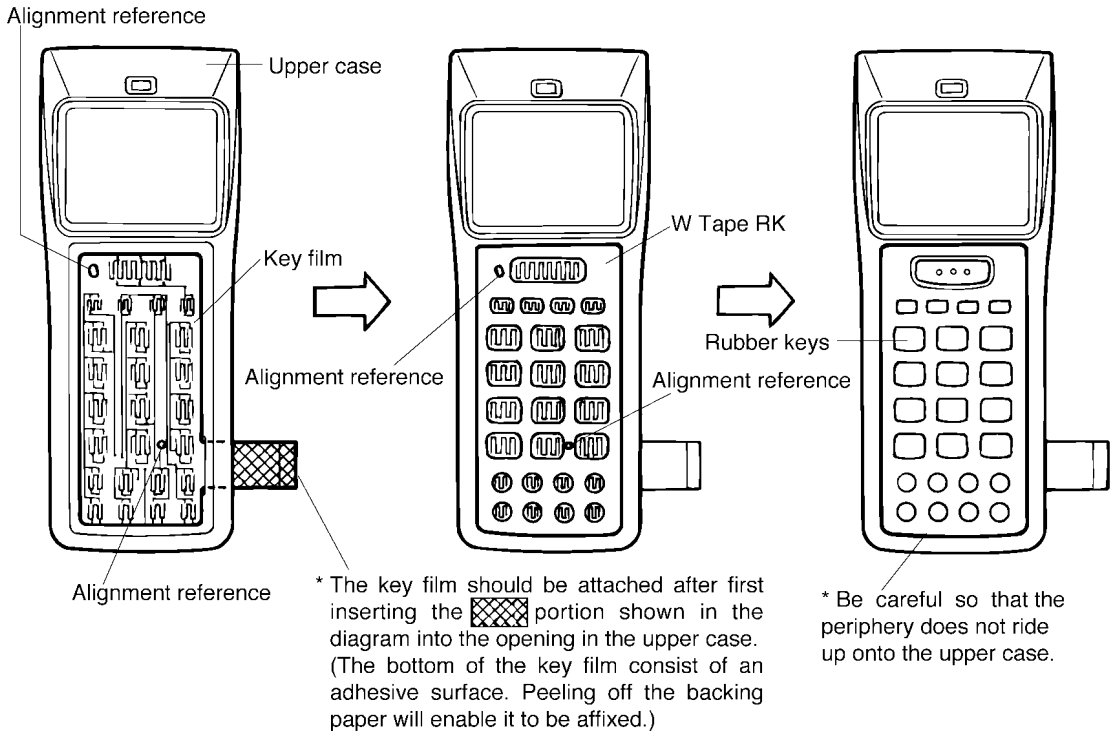


6-6. Removal and Attachment of Upper Case Key Unit

1) Since the rubber keys and key film are adhered with double-sided adhesive tape in the order shown below, remove each component by carefully prying a small minus precision screwdriver or similar tool between the gaps while being careful not to damage the upper case.

   [Composite Parts] Rubber keys
   +
   Double-sided adhesive tape (part name: W Tape RK)
   +
   Key film (with the adhesive side down)
   +
   Upper case

2) Attachment is performed by affixing the components in the order moving from left to right in the diagram below.


Alignment reference
Upper case
Key film
Alignment reference
W Tape RK
Rubber keys
Alignment reference
Alignment reference
* The key film should be attached after first inserting the portion shown in the diagram into the opening in the upper case. (The bottom of the key film consist of an adhesive surface. Peeling off the backing paper will enable it to be affixed.)
* Be careful so that the periphery does not ride up onto the upper case.

7. Diagnostic Program

1) At the first setting up, Press [9] and [On] keys after the batteries set.
2) After the second time, Press [9] and [Init] keys.
   Ensure that the [9] key is push later.
   [1] to [6] keys
   Push [0] key to next screen

Screen 1

1.MAIN RAM
2.MASK ROM
3.FLASH
4.CLOCK
5.KEY
6.DISPLAY

↓

Screen 2

1.COMS/3PIN
2.IR_i/f
3.LB1
4.LB0
5.LB-1
6.LB-2

Press [1] to [6] keys
Test execution

Normal end

↓

Screen 3

1.BATTERY SW
2.INITIAL SW
3.BUZZER
4.G/R LED
5.BK LED
6.LASER

Press [1] to [6] keys
Test execution

Normal end

↓

Screen 4

1.AGEING
2.RAM_Keep
3.E_CURRENT
4.VCCI
5.I/O BOX_set

Press [1] to [5] keys
Test execution

Normal end

↓

Screen 5

1.SYNTHESISI
2.Bar_code
Demo
6.DISPLAY

Press [1] to [2] keys
Test execution

Normal end
For Bar code demonstration is end by OFF.
Display for time-out error: 1 minute
Display for time-out off: 30 minute

↓

Screen1

8. Error code

Menu No.	Test No.	Module Name	Error Function	Error No.	LCD Message
1	1	**Main Ram**	Invalid Status setting	1101	Status(The Ram volume distinction)
			Data error	1102	W/R data Address
			Address line error	1104	Defective address
	2	**Main ROM**	Data error	1201	Expectation value /Read Sum Sum range address
	3	**Flash**	Data error	1301	Write/Read data address
	4	**Clock**	Read error	1401	Write/Read data address
			Time out error	1402	(Time out)
			RTC timer interrupting error	1403	(Time out)
			General timer interrupting error	1404	(Time out)
	5	**Key**	Interrupt non detection error	1501	(Time out)
	6	**Display**	Data error	1601	Write/Read data(LCD)
			Time out error	1602	(Time out)

Menu No.	Test No.	Module Name	Error Function	Error No.	LCD Message
2	1	**14 PIN**	Received data error	2101	Send/Receive error data
			CHR length error	2102	[OPER]
			Parity error	2103	[PER]
			Stop bit error	2104	[TRAS]
			RS sending/CS receiving error	2105	(by test No. 2)
			ER sending/DR receiving error	2106	(by test No. 2)
			CD receiving error	2107	(by test No. 2)
			Time out error	2108	(Time out)
	2	**IR_I/F**	Receiving error	2201	Send/Receive error data
			CHR length error	2202	[OPER]
			Parity error	2203	[PER]
			Stop bit error	2204	[TRAS]
			Time out error	2205	(Time out)
	3	**LB1**	LB1 found data error	2301	(Time out)
			LB1 return voltage error	2302	(Time out)
			LB1 before generation error	2303	
	4	**LB0**	LB0 found data error	2401	(Time out)
			LB0 return voltage error	2401	(Time out)
			LB0 before generation error	2401	
	5	**LB-1**	LB-1 found data error	2501	(Time out)
			LB-1 before generation error	2502	
	6	**LB2**	LB2 found data error	2601	(Time out)
			LB2 return voltage error	2602	(Time out)
			LB2 before generation error	2603	

Menu No.	Test No.	Module Name	Error Function	Error No.	LCD Message
3	1	**BATTERY SW**	SW found error	3101	(Time out)
			SW refund error	3102	(Time out)
			Before SW setting error	3103	
	2	**INITIAL SW**	SW found error	3201	(Time out)
			SW refund error	3202	(Time out)
			Before SW setting error	3203	
	3	**BUZZER**			Limited sound check only
	4	**G/R LED**			Limited eye measurement only
	5	**BK LED**			Limited eye measurement only
	6	**LASER**	Data error	3601	Data read Counting

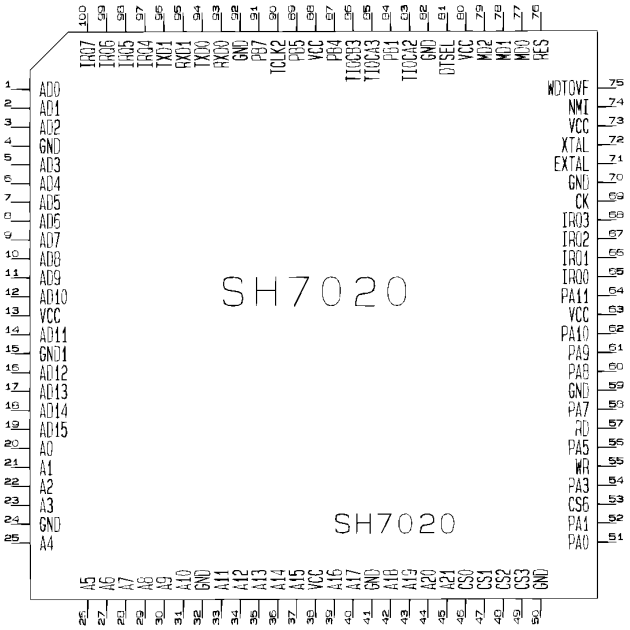
Menu No.	Test No.	Module Name	Error Function	Error No.	LCD Message
4	1	**AGING**	Invalid Status setting	1101	Status(The Ram volume distinction)
			Data error	1102	W/R data Address
			Address line error	1104	Defective address
	2	**RAM_Keep**	Invalid Status setting	1101	Status(The Ram volume distinction)
			Data error	1102	W/R data Address
			Back up resistor error	1103	
			Address line error	1104	Defective address
	3	**E_CURRENT**			
	4	**VCCI**	Received data error	2101	Send/Receive error data
			CHR length error	2102	[OPER]
			Parity error	2103	[PER]
			Stop bit error	2104	[TRAS]
			RS sending/CS receiving error	2105	(by test No. 2)
			ER sending/DR receiving error	2106	(by test No. 2)
			CD receiving error	2107	(by test No. 2)
			Time out error	2108	(Time out)
	5	**I/B BOX_set**	I/O box Found data error	4501	(Time out)
			I/O box error		(Time out)

Menu No.	Test No.	Module Name	Error Function	Error No.	LCD Message
5	1	**SYNTHESISI**	As same as above 1-1. to 4-5.		
	2	**Bar_code Demo**			

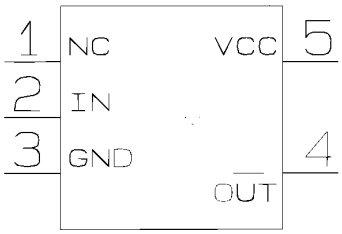
Menu No.	Test No.	Module Name	Error Function	Error No.	LCD Message
Other			Abnormality program error	5101	
			Abnormality interrupt error	5102	

9. IC Data

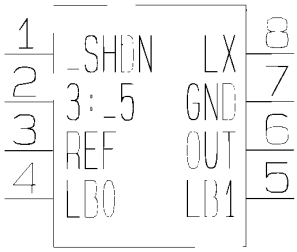
1) SH7020



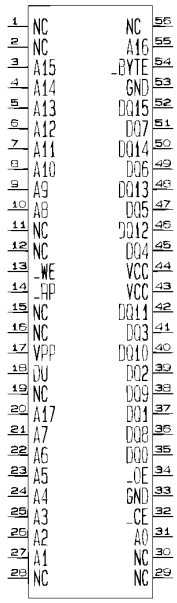
2) 7S04



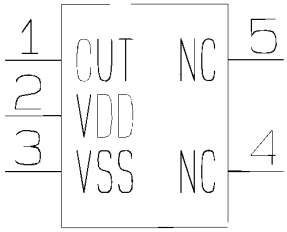
3) MAX756



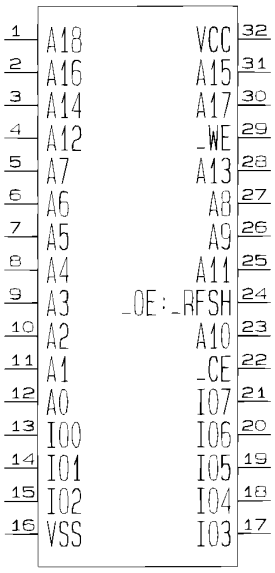
4) E28F200BL



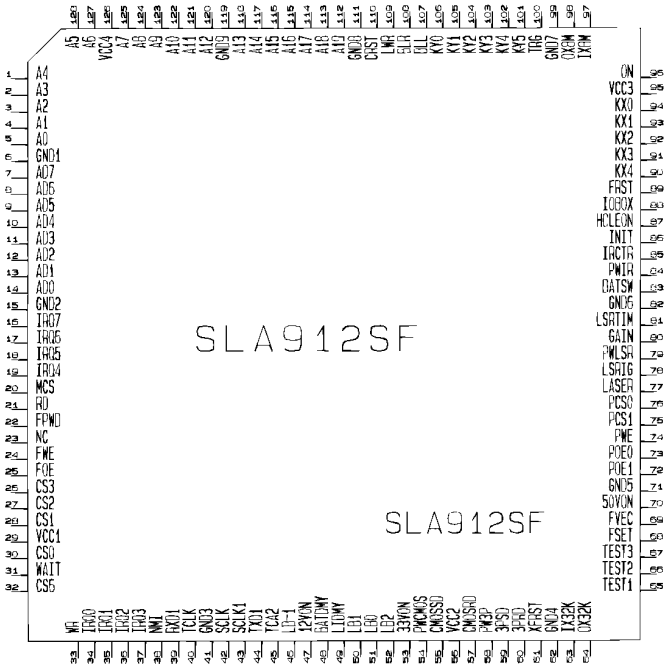
5) RN5VT



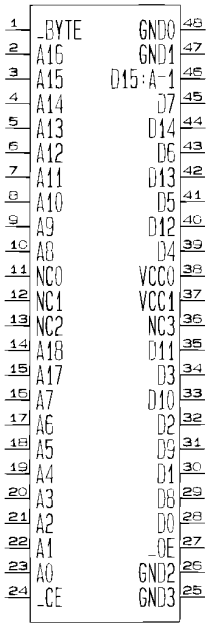
6) HM65W8512



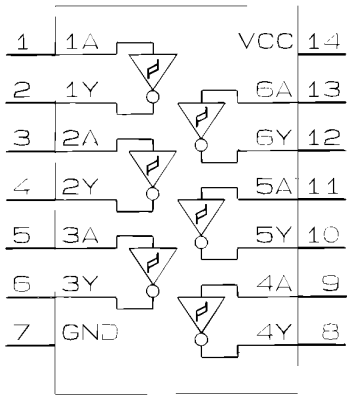
7) SLA912SF



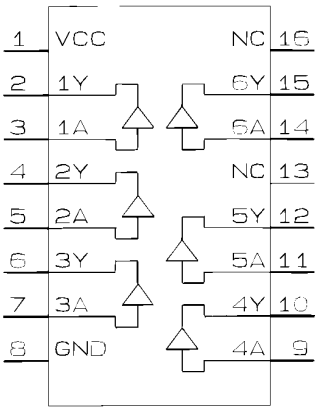
10) MB838200



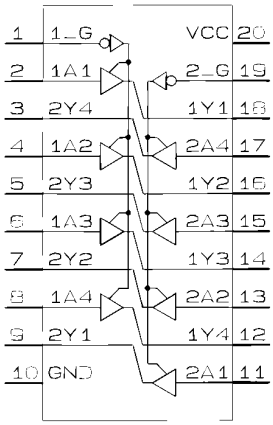
11) HC14



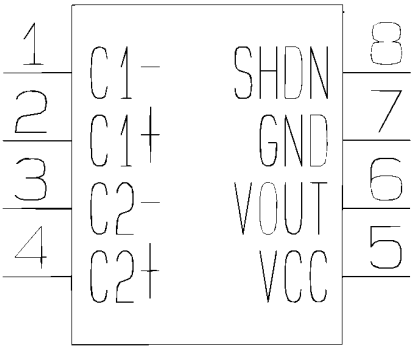
8) HC4050



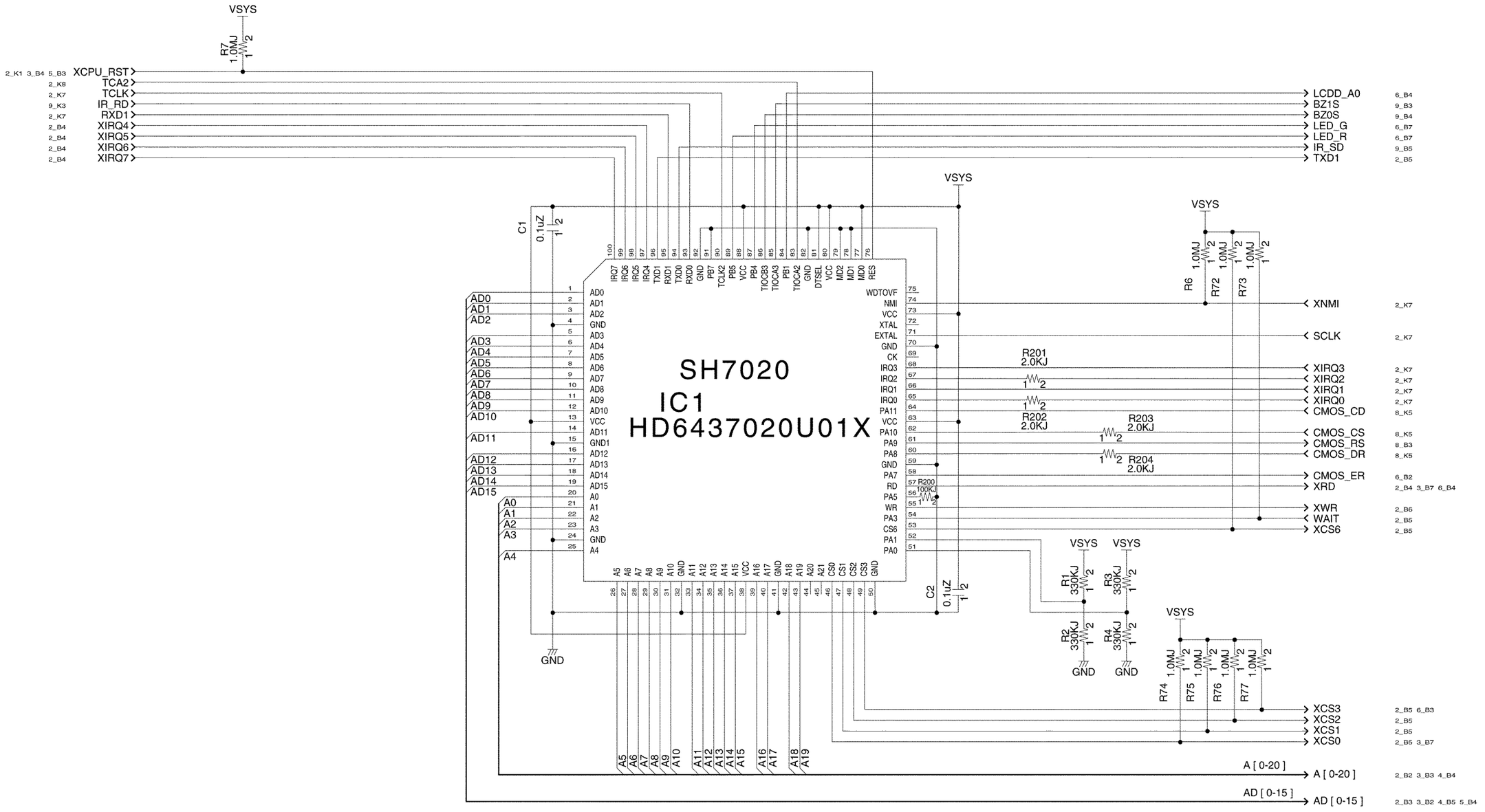
12) HC244



9) MAX662



10. Circuit diagram



NOTE : Resistor which has non-mark is type 1005.
Capacitor which has non-mark is type 1608.
R1 is not mounted.

MODEL	R3	R4
PX-690AA	×	○
PX-690EA	○	×

Description :	Board No :	Drawing No :
CPU	P690-MAIN (1/9)	C240406

IC2
SLA912SF3S

7_B5	XTRG
1_K7 3_B3 4_B4	A [0-20]
1_K7 3_B2 4_B6 6_B4	AD [0-15]
1_B2	XIRQ7
1_B2	XIRQ6
1_B2	XIRQ5
1_B2	XIRQ4
3_B7	XMCS
1_K5 3_B7 6_B4	XRD
3_B5	FPWD
3_B3	XFWE
3_B7	XFOE
1_K7 5_B3	XCS3
1_K7	XCS2
1_K7	XCS1
1_K7 3_B7	XCS0
1_K5	WAIT
1_K5	XCS6
1_K5	XWR
1_K2	TXD1
5_K7	XLB-1
5_K6	XLB1
5_K6	XLB0
5_K7	LB2
8_K6	CMOS_RD
8_K7	3P_RD
9_K3	XHRD_RST

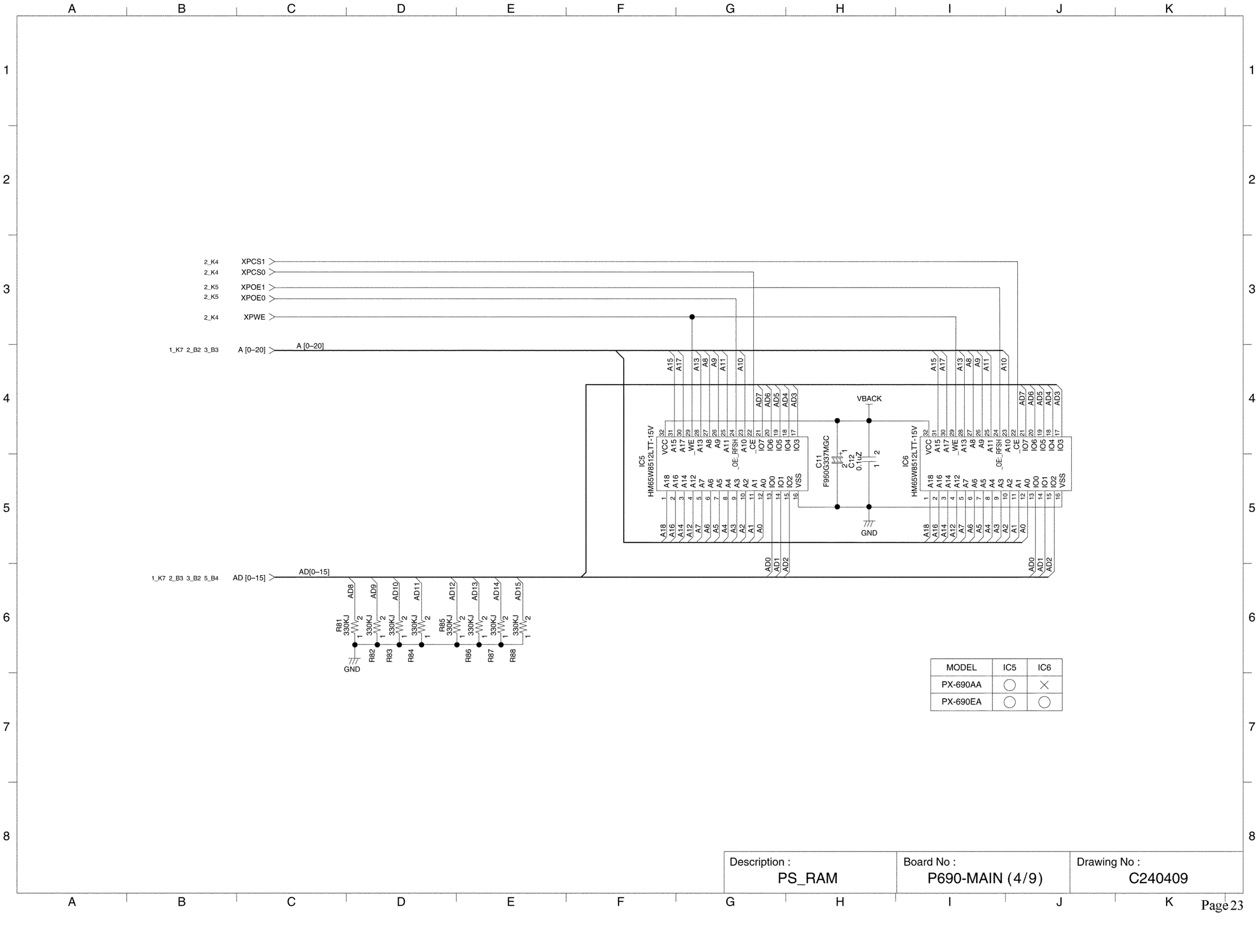
BLL	6_B6
BLR	6_B5
XLCD_WR	6_B4
XCPU_RST	1_B2 6_B3
KY [0-5]	7_B5
XON	7_B6
KX [0-4]	7_B8
HRD_RST	9_K4
HOLE	9_K4
XPW_HOLE	9_B5
XINIT	9_K4
IR_CTL	9_B7
XPW_IR	9_B6
LSR_TIMING	7_B4
LSR_GAIN	7_B4
XPW_LSR	7_B3
LSR_SGNL	7_B4
LSR	7_B4
XPCS0	4_B3
XPCS1	4_B3
XPWE	4_B3
XPOE0	4_B3
XPOE1	4_B3
X50VON	5_B4
XBAT_SW	9_K3
XIRQ0	1_K4
XIRQ1	1_K4
XIRQ2	1_K4
XIRQ3	1_K4
XNMI	1_K3
RXD1	1_B2
TCLK	1_B2
SCLK	1_K4
TCA2	1_B2
X12VON	5_B3
BAT_DMY	5_B7
LI_DMY	5_B6
X33VON	5_B3
XPW_CMOS	8_B2
CMOS_SD	8_B3
XPW_3P	8_B6
3P_SD	8_B8

BOOT METHOD	R10	R80
FROM BOOT	○	×
MASKROM BOOT	×	○

FLASH ROM	R8	R9
MOUNT	○	×
NON MOUNT	×	○

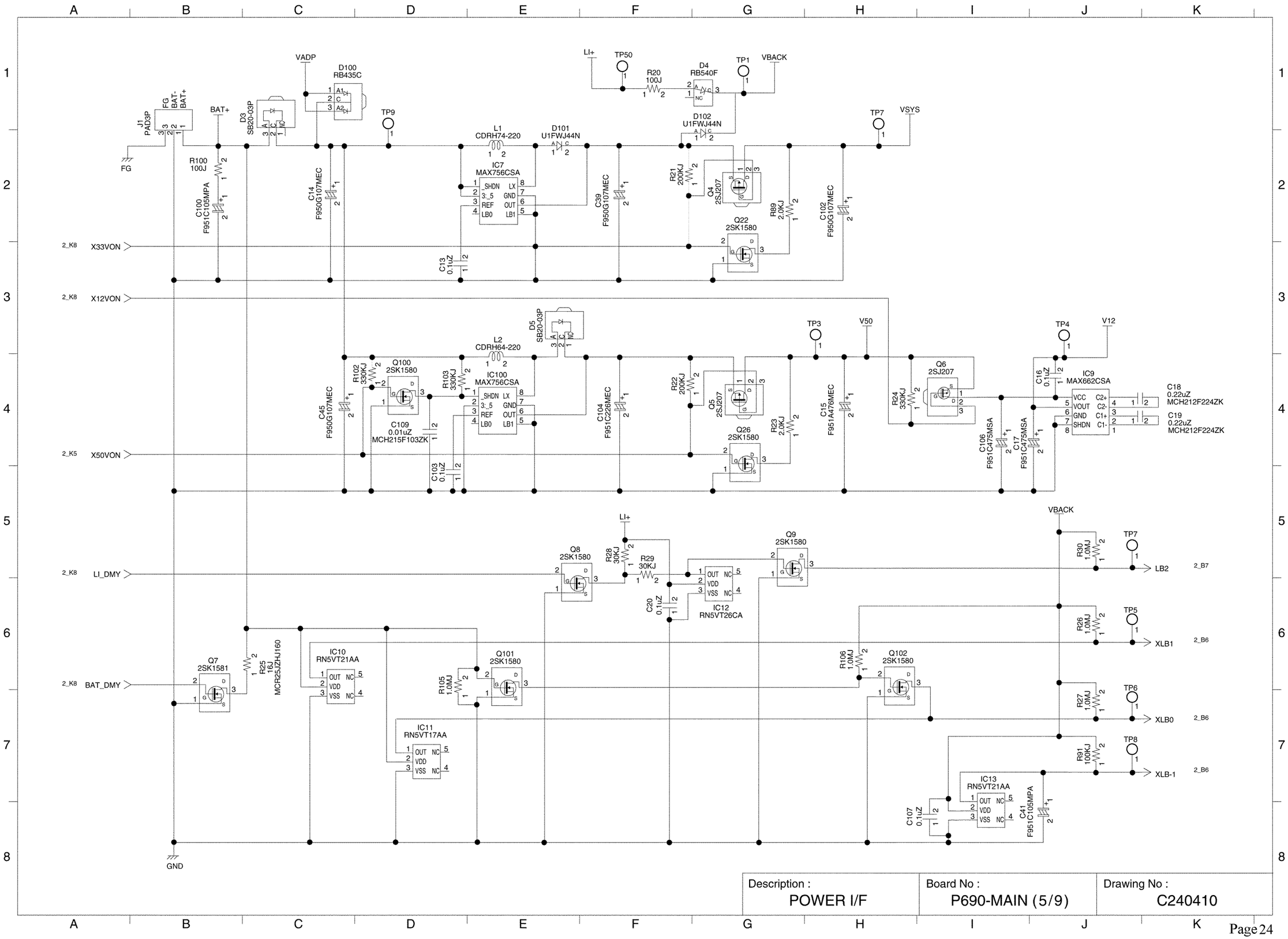
Description :	Board No :	Drawing No :
GA	P690-MAIN (2/9)	C240407

Description :	Board No :	Drawing No :
FROM/MROM	P690-MAIN (3/9)	C240408

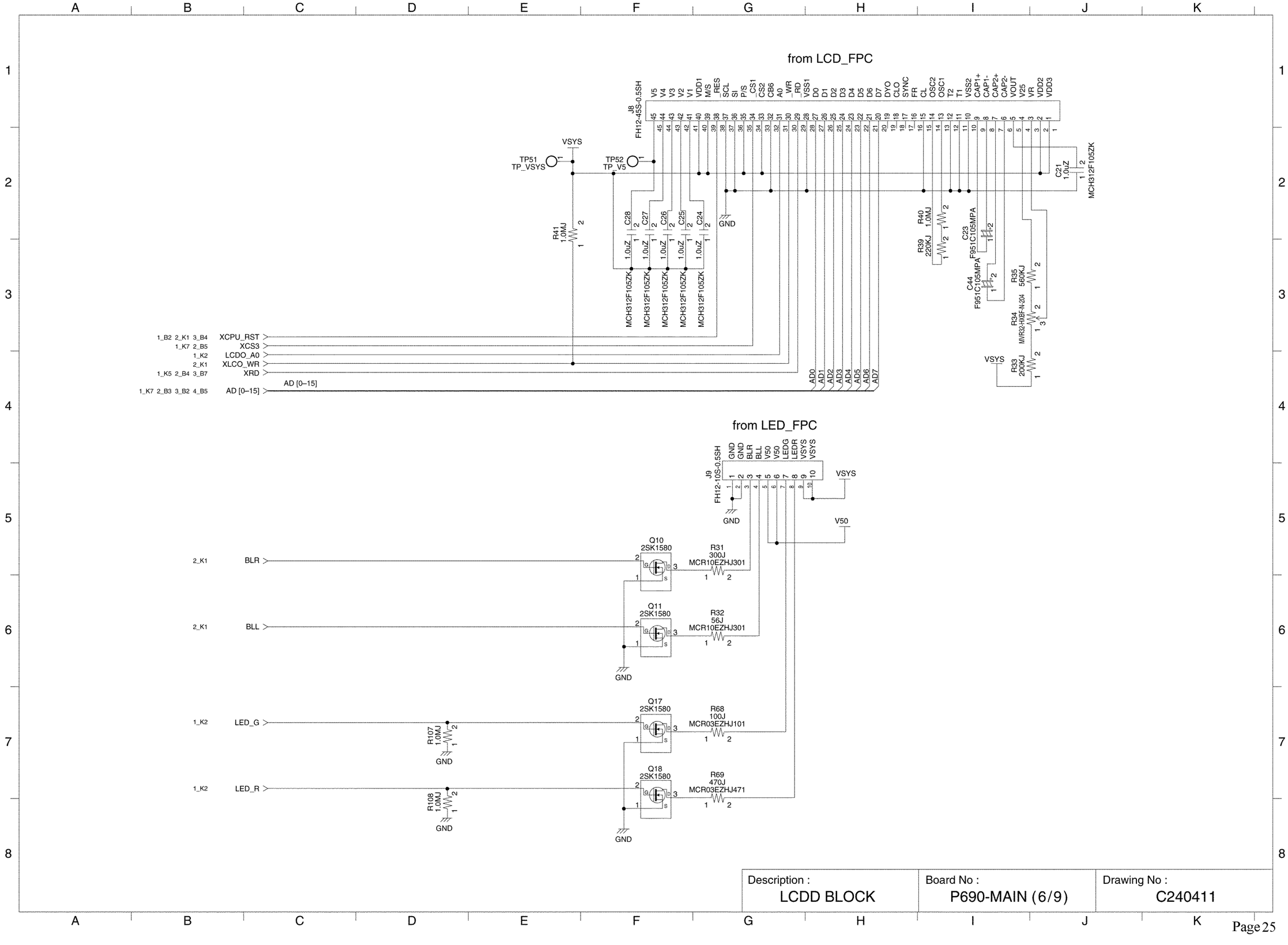


MODEL	IC5	IC6
PX-690AA	○	×
PX-690EA	○	○

Description :	Board No :	Drawing No :
PS_RAM	P690-MAIN (4/9)	C240409



Description :	Board No :	Drawing No :
POWER I/F	P690-MAIN (5/9)	C240410



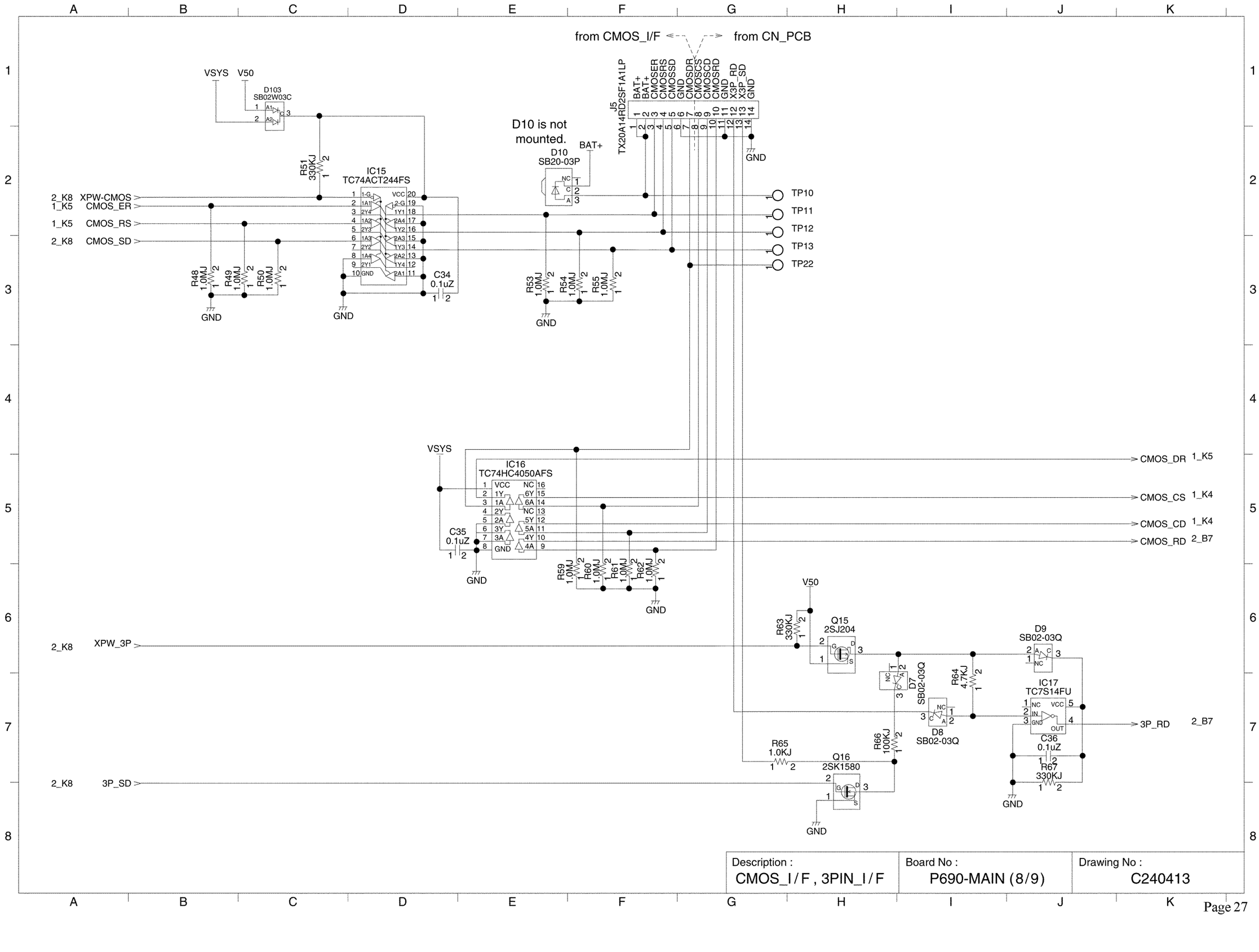
Description :	Board No :	Drawing No :
LCDD BLOCK	P690-MAIN (6/9)	C240411

from LASER_MOD

from Key-Film

VSYS
R109 47KJ
C108 0.1uZ
R42 330KJ
2_K4 XPW_LSR
Q12 2SJ207
Q103 2SK1580
R110 2.0KJ MCR03EZHJ202
R43 1.0MJ
C30 0.1uZ
C31 F951A226MBA
GND
J3 PAD6P
VCC
LASER
TIMING
SIGNAL
GAIN
GND
2_K4 LSR
2_K4 LSR_TIMING
2_K4 LSR_SGNL
2_K4 LSR_GAIN
R111 1.0MJ
R112 1.0MJ
GND
J4 FH12-30(14)SB-1SH
XTRG
GND
XON
KY0
KY1
KY2
KY3
KY4
KY5
KX0
KX1
KX2
KX3
KX4
TP18
TP21
TP20
TP19
TP17
TP15
TP16
TP53 TP_ON
VSYS
VBACK
R44 100KJ
R45 100KJ
R46 100KJ
R47 100KJ
2_K2 KY (0–5)
KY (0–5)
2_K3 KX (0–4)
KX (0–4)
2_B1 XTRG
2_K3 XON
C32 0.1uZ
C33 0.1uZ
GND

Description :	Board No :	Drawing No :
LASER_I/F , KEY_I/F	P690-MAIN (7/9)	C240412


from CMOS_I/F
from CN_PCB
J5
TX20A14RD2SF1A1LP
BAT+
BAT+
CMOSER
CMOSRS
CMOSSD
GND
CMOSDR
CMOSCS
CMOSCD
CMOSRD
GND
X3P_RD
X3P_SD
GND
VSYS
V50
D103
SB02W03C
R51
330KJ
IC15
TC74ACT244FS
D10 is not mounted.
D10
SB20-03P
BAT+
2_K8 XPW-CMOS
1_K5 CMOS_ER
1_K5 CMOS_RS
2_K8 CMOS_SD
R48 1.0MJ
R49 1.0MJ
R50 1.0MJ
R53 1.0MJ
R54 1.0MJ
R55 1.0MJ
C34
0.1uZ
GND
TP10
TP11
TP12
TP13
TP22
VSYS
IC16
TC74HC4050AFS
C35
0.1uZ
R59 1.0MJ
R60 1.0MJ
R61 1.0MJ
R62 1.0MJ
CMOS_DR 1_K5
CMOS_CS 1_K4
CMOS_CD 1_K4
CMOS_RD 2_B7
V50
R63
330KJ
Q15
2SJ204
2_K8 XPW_3P
D9
SB02-03Q
D7
SB02-03Q
D8
SB02-03Q
R64
4.7KJ
IC17
TC7S14FU
3P_RD 2_B7
R65
1.0KJ
Q16
2SK1580
R66
100KJ
C36
0.1uZ
R67
330KJ
2_K8 3P_SD
Description :
CMOS_I/F , 3PIN_I/F
Board No :
P690-MAIN (8/9)
Drawing No :
C240413

from SUB_PCB

J7
IL402-16S-E1000
HRD_RST
GND
BZ+
BZ-
XINIT
LI+
HOLE
VHOLE
IR_SD
GND
IR_CTL
VIR
IR_RD
VBACK
XBAT_SW
XHRD_RST

V50S
GND
TP23
TP24
TP26
TP27
TP28
TP29
TP14

XHRD_RST 2_B7
XBAT_SW 2_K5

VBACK
VSYS
IC19
TC7SH04FU
NC VCC
IN
GND OUT
C42
0.1uZ
R113
10KJ
IR_RD 1_B2

1_K2 BZ1S
Q24
2SK1580
R92
100J
MCR03EZHJ101
R56
1.0MJ
R57
1.0MJ
GND

1_K2 BZ0S
Q25
2SK1580
R93
56J
MCR03EZHJ560
GND

LI+

XINIT 2_K3
HRD_RST 2_K3

V50
R70
330KJ
2_K3 XPW_HOLE
Q19
2SJ204
HOLE 2_K3

VSYS
IC20
TC7SH04FU
NC VCC
IN
GND OUT
C43
0.1uZ
GND
1_K2 IR_SD

2_K4 IR_CTL

V50
R71
330KJ
2_K4 XPW_IR
Q20
2SJ204

Description :	Board No :	Drawing No :
SUB_I / F	P690-MAIN (9/9)	C240414

to MAIN_PCB

J2
PAD2P
GND
LI+

J1
IL402-16S-E1000
HRD_RST
GND
BZ+
BZ-
XINIT
LI+
HOLE
VHOLE
IR_SD
GND
IR_CTL
VIR
IR_RD
VBACK
XBAT_SW
XHRD_RST

E1
PMX-04B

VBACK

D1
SIM-20SB-MO1

D2
SIM-20SB-MO1

IC1
RPM-20CT-MO1
VCC
OUT
GND

R1
2.0KJ

R2
2.0KJ

R3
1.0MJ

C1
0.1uZ

Q1
2SK1580

Q2
2SK1580

R8
4.7KJ

IC12
THS117
VCC
OUT+
OUT-
GND

R9
390J

R10
390J

R11
330KJ

IC3
UPC393G2-T2
OUT1
V+
OUT2
IN1
IN2
V-

C5
0.1uZ

C6
F950J226MAA

IC4
TA75S393F
IN-
VCC
VEE
IN+
OUT

IC4 is interchangeable parts of IC3.

Frame inside article is not mounted.

R4
1.0MJ

SW1
SKHMPU-T3000

C2
0.1uZ

R7
1.0MJ

SW3
ESE-103111

C4
0.1uZ

R6
1.0MJ

Q3
2SK1580

R5
1.0MJ

SW2
SKHMPU-T3000

C3
0.1uZ

GND

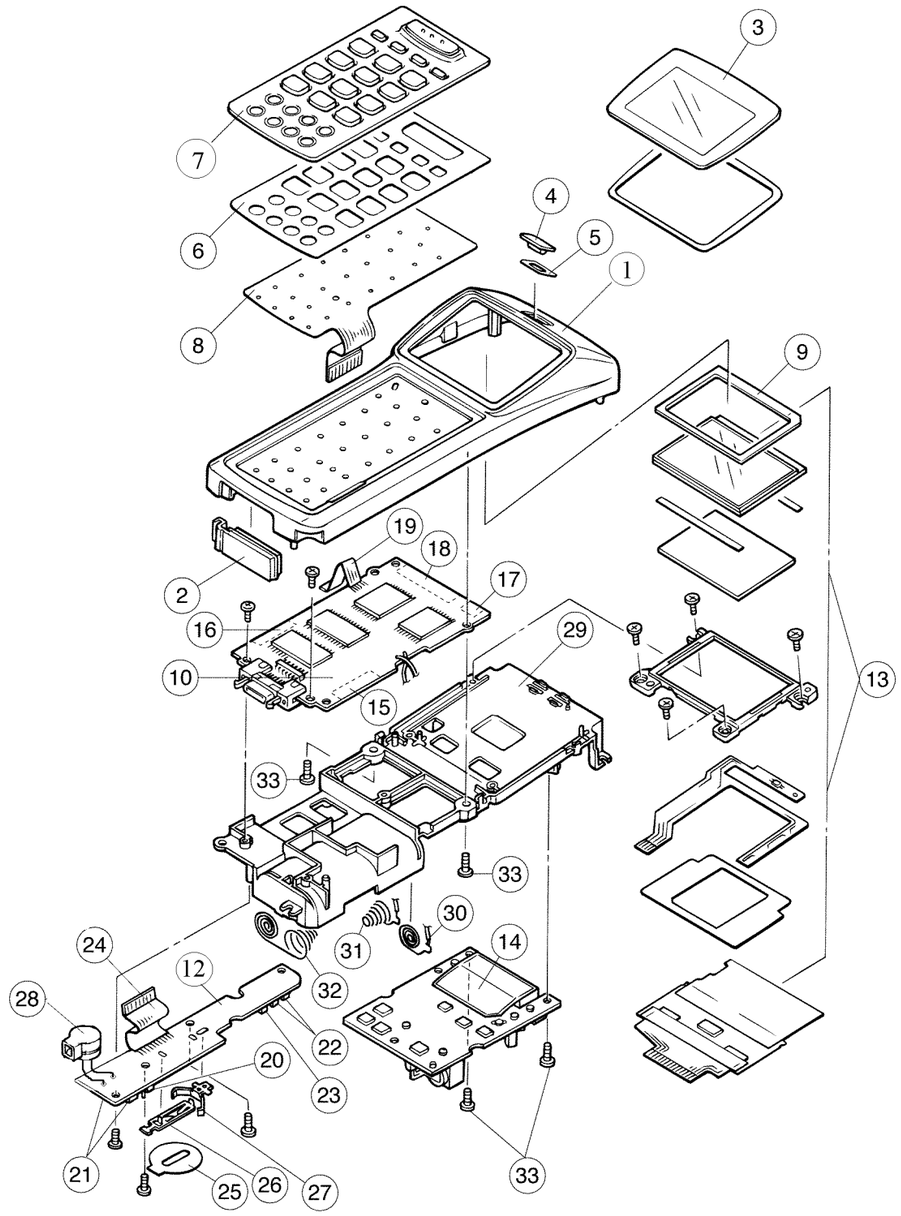
Description :	Board No :	Drawing No :
I/R_I/F , SW , etc	P690-SUB (1/1)	C240416

11. Parts list

1. Upper case block
2. Middle case block
3. Lower case block
4. Other

Note:

1. Price and specifications are subject to change without notice.
2. As for order / supply of parts, refer to the “Guide book for spare parts supply” a separate publication.
3. The numbers in the item column correspond to the same numbers in exploded drawing.
4. Marks:
    - N: New parts
    - Q: Quantity used per unit
    - M: Minimum order / supply quantity
    - R: Rank
        - A: Essential
        - B: Stock recommended
        - C: Less recommended
        - X: No stock recommended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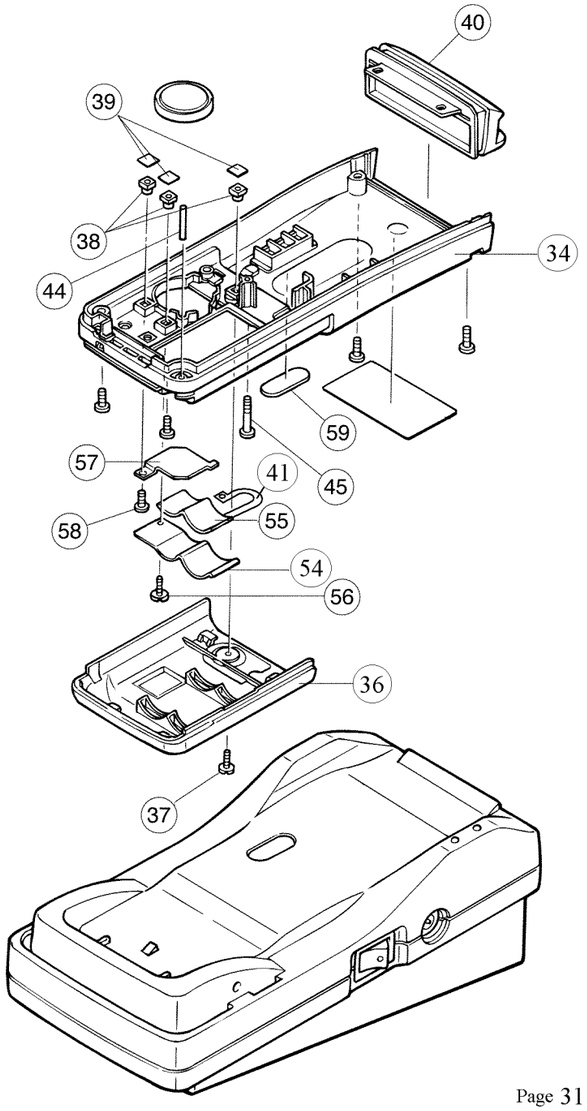
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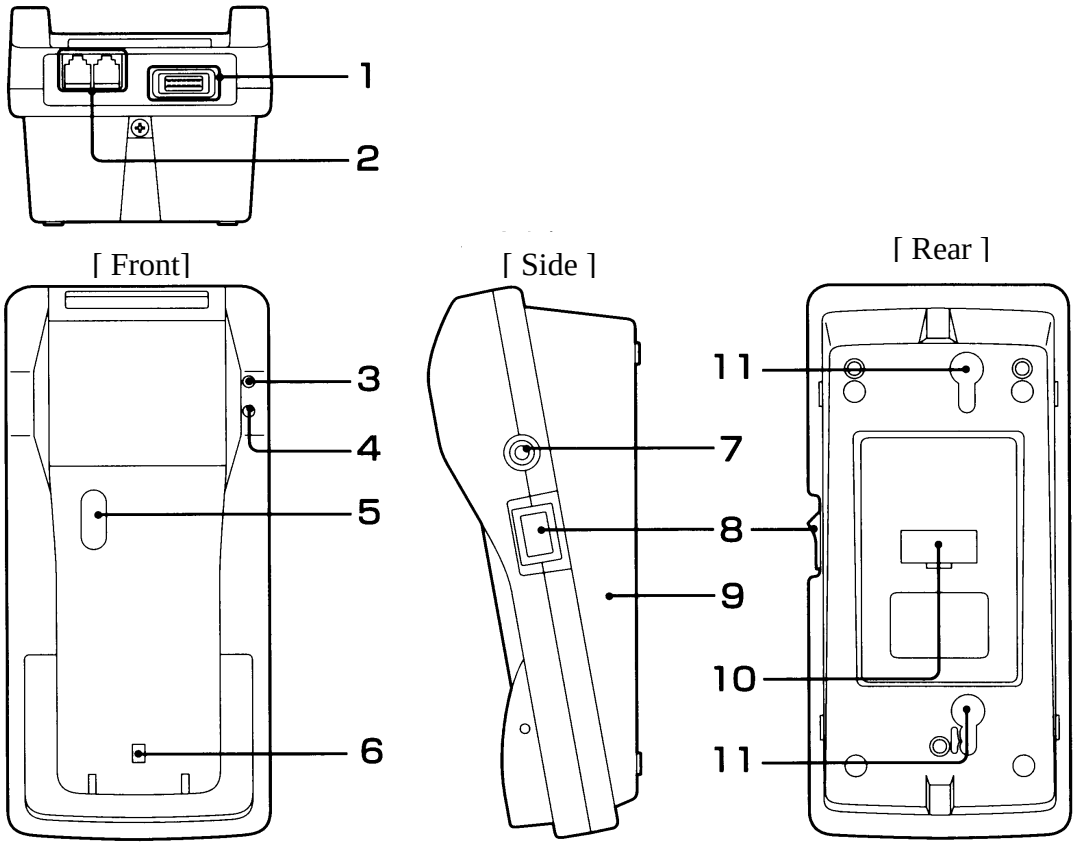
	Code No.	Parts Name	Specification	Version	Q'ty	Rank
1. Upper case block						
1	6541 4238	Upper case ass'y	C340186*2	DT710	1	A
	6541 5757	Upper case ass'y	C340186*10	DT700EB	1	A
	6541 4469	Upper case ass'y	C340186*4	DT700E	1	A
2	6513 1468	Connector cover	C240126-1	DT710	1	B
	6513 4779	Connector cover	C240126-3	DT700EB/E	1	B
3	6513 1564	Display window	C440156-1	DT710	1	A
	6513 5283	Display window	C440156-2	DT700EB/E	1	A
4	6513 1503	LED window	C340119-1		1	A
5	6513 1559	W tape LE-P690	C440119-1	DT710	1	C
	6513 4765	W tape LE-P790	C440119B-3	DT700EB/E	1	C
6	6513 4338	W tape RK-P797	C240270-1	DT710	1	A
	6513 7768	W tape RK-A-P689	C240607-1	DT700EB	1	A
	6513 1454	W tape RK-P690	C240120-1	DT700E	1	A
7	6513 4296	Rubber key-P797	C140171-1	DT710	1	A
	6513 9336	Rubber key A-P790	C140279A-3	DT700EB	1	A
	6513 4807	Rubber key P790	C140026A-3	DT700E	1	A
8	6513 4387	Key film sub ass'y	C340447*1	DT710	1	A
	6513 1699	Key film sub ass'y	C340188*1	DT700EB/E	1	A
2. Middle case block						
9	6513 2343	Tape P690	C440111A-1		1	C
10	6541 2327	Main PCB ass'y (P690-MAIN)	C140051*1 (512KB)		1	A
	6541 2334	Main PCB ass'y (P690-MAIN)	C140051*2 (1MB)		1	A
12	6541 2383	Sub PCB ass'y(P690-SUB)	C240144*1	DT710/700EB	1	A
	6541 6135	Sub PCB ass'y(P690-SUB)	C240144*3	DT700E	1	A
IC3	2011 9772	LSI	E28F200BL-B150		1	C
IC1	2011 9779	LSI	HD6437020U01X		1	C
IC5,6	2011 9786	LSI	HM65W8512LTT-15V		1	C
IC4	2011 9793	MASK-R0M	MB838200BLPFTN-12A		1	C
IC2	2011 9807	LSI	SLA912SF3S		1	C
L1	3841 1519	Coil	CDRH74-220MC		1	C
IC105	2105 3381	CMOS-IC	TC7S14FU-TE85L		1	C
IC7	2105 3619	CMOS-IC	MAX662CSA		1	C
IC15,16	2105 3696	CMOS-IC	TC7SH04FU-TE85L		3	C
IC14	2105 3696	CMOS-IC	TC7SH04FU-TE85L		3	C
D5,10,103	2390 1533	Diode	SB20-03P-TC		2	C
D6,7,8	2390 2492	Diode	SB02W03C-TR		2	C
IC12,18	2105 3661	MOS-IC	RN5VT21AA-TR		2	C
IC10,13	2105 3668	MOS-IC	RN5VT26CA-TR		1	C
IC11	2105 4011	CMOS-IC	RN5VT17AA-TR		1	C
X2	2590 1939	Ceramic vibrator	PBRC9.83BR		1	C
X1	2590 2310	Crystal Oscillator	MC-306-32.768-7.0P		1	C
IC100,101	2105 3997	CMOS-IC	MAX756CSA		2	C
Q2,9-10 Q13-19 Q21-22 Q27,31 Q33,100 Q102-105	2254 0336	Chip transistor	2SK1580-T1B		16	C
Q1,8,11 Q20,32	2259 2016	Chip transistor	2SJ207-T1B		5	C
Q26,29 Q101	2259 1596	Chip transistor	2SJ204-T1B		3	C

	Code No.	Parts Name	Specification	Version	Q'ty	Rank
D4	2390 2275	Diode	1SS378(TE85L)		1	C
13	6541 2376	LCD ass'y	C240143*1		1	B
14	2725 1029	Laser module	VLM-1600		1	A
15	3501 9492	Connector 30P	FH-12-30(14)SB-1SH		1	B
16	3501 8106	Connector 16P	IL402-16S-E1000		1	B
17	3501 9240	Connector 10P	FH-12-10S-0.5SH		1	B
18	3501 9247	Connector 45P	FH-12-45S-0.5SH		1	B
19	6513 1517	FFC cable	C440109-1		1	B
20	3412 1099	Push switch	ESE-103111		1	C
21	3412 1204	Tact switch	SKHMPU-T3000		2	C
22	2370 0994	LED	SIM-20SB-M01		2	C
23	2259 2149	Photo sensor	RPM-20CT-M01		1	C
24	6513 1587	FFC cable	C440145-1		1	C
25	6511 0810	Isolation plate	C412283-1		1	C
26	6511 0780	Battery spring B	C412183-1		1	C
27	6511 0770	Battery spring K	C311380-1		1	C
28	3122 3206	Buzzer	CB-09FW25	DT710/700EB	1	C
	3831 0805	Buzzer	PMX-04B	DT700E	1	C
29	6513 4800	Inner case P790	C140022-3		1	C
30	6513 1622	Battery spring B	C440196-1		1	C
31	6513 1615	Battery spring C	C440195-1		1	C
32	6406 4412	Battery spring A	C413002B-1		1	C
33	6328 9130	Screw	A44793-7		2	C
3. Lower case block						
34	6541 2425	Lower case ass'y	C340187*1	DT710	1	C
	6541 4462	Lower case ass'y	C340187*3	DT700EB	1	C
	6541 6233	Lower case ass'y	C340187*8	DT700E	1	C
36	6513 1440	Battery cover	C140036-1	DT710	1	A
	6513 7152	Battery cover	C140036A-3	DT700EB	1	A
	6513 4814	Battery cover	C140036-3	DT700E	1	A
37	6513 4415	Coin Screw A-P693AA	C440762-1		1	B
38	6513 1601	Nat P690	C440160-1		3	C
39	6513 2273	Tape P690	C440421-1		2	C
40	6513 2168	Nose cap sub ass'y	C340248*1	DT710		A
	6513 4744	Nose cap sub ass'y	C340248*3	DT700EB/E	1	A
41	6514 7110	B Strap-P690	C441157-1	DT710/700EB	1	B
44	6513 1706	Shaft P690	C440115-1		1	C
45	6513 1573	Screw LZ-A-P690	C440142-1		1	C
54	6513 1482	Battery guide plate A	C340084-1	DT710/700EB	1	C
55	6513 2987	Cushion	C440459-1		1	C
56	6513 1678	Screw	C440248-1		1	C
57	6513 1489	Battery guide plate B	C340085-1		1	C
58	6511 2090	Screw	C411820-4		1	C
59	6513 1300	Filter P905	C440110-1		1	C
4. Other						
47	6513 2133	Hand strap	TYPE-A(BL)		1	B

DT-760 IO Box (PX-905)

1. Each part name and a work



1. RS-232C Connector (To PC)
2. RS-485 Connector (Between I/O Box & I/O Box)
3. LED for power supply indication
4. LED for access indication
5. Infrared rays interface
6. DT-700 attaching switch
7. AC adopter connector
8. Power switch
9. The establishment unit
10. Dip switch
11. A hole for wall credit

2. Specification

1) Infrared rays communication specification
   Interface: infrared rays
   Synchronous idle: SS (Start-stop) system
   Line speed: SS (Start-stop) system, 1,200 ~ 19,200 bps

2) RS-232C
   Synchronous idle: SS (Start-stop) system
   Line speed: SS (Start-stop) system, 1,200 ~ 19,200 bps
   Data communication control procedure:
   Full duplex (Limited Infrared rays) / Half duplex

3) RS-485
   Synchronous idle: SS (Start-stop) system
   Line speed: 1,200 ~ 9,600 bps
   Data communication control procedure: Half duplex

4) Electric power supply specifications
   Activity electric power supply: Dedication AC adapter
   Model: 5Y40231
   Input: AC100V, 50/60 Hz
   Output: DC9V, 600mA
   Consumption current: Approximately 75 mA

5) Facility
   Infrared rays interface (DT-700 connection)
   RS-232C interface (PC connection)
   RS-485 interface X 2 channel (I/O box Chaining connection)

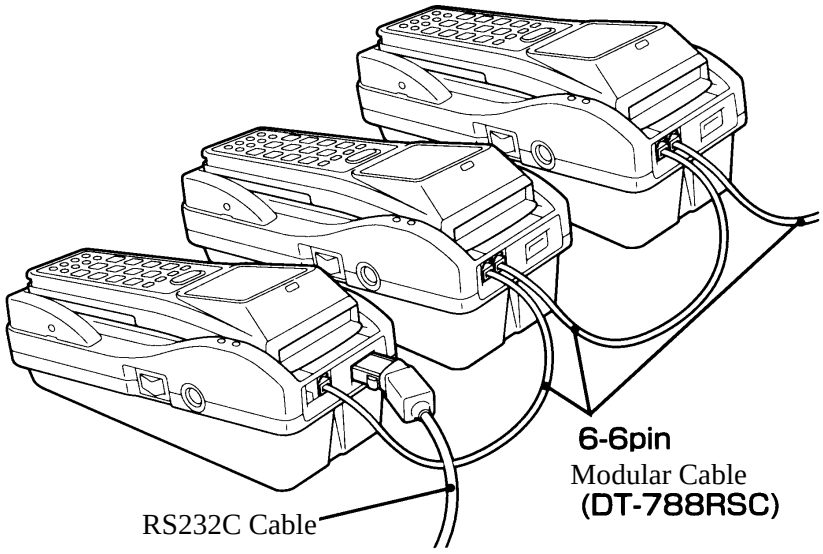
6) The most head total elongatedness spacing of communication cable:
   1,000 [m] (max 1,800 [m] under good condetion 0.2 /m)

7) Maximum connection number: 16

8) The second seed of VCCI

9) Outline dimension, weight
   In wall credit: 94(W) X 200(D) X 96.2(H) mm
   270 g
   Deferment 94(W) X 200(D) X 76(H) mm
   250 g

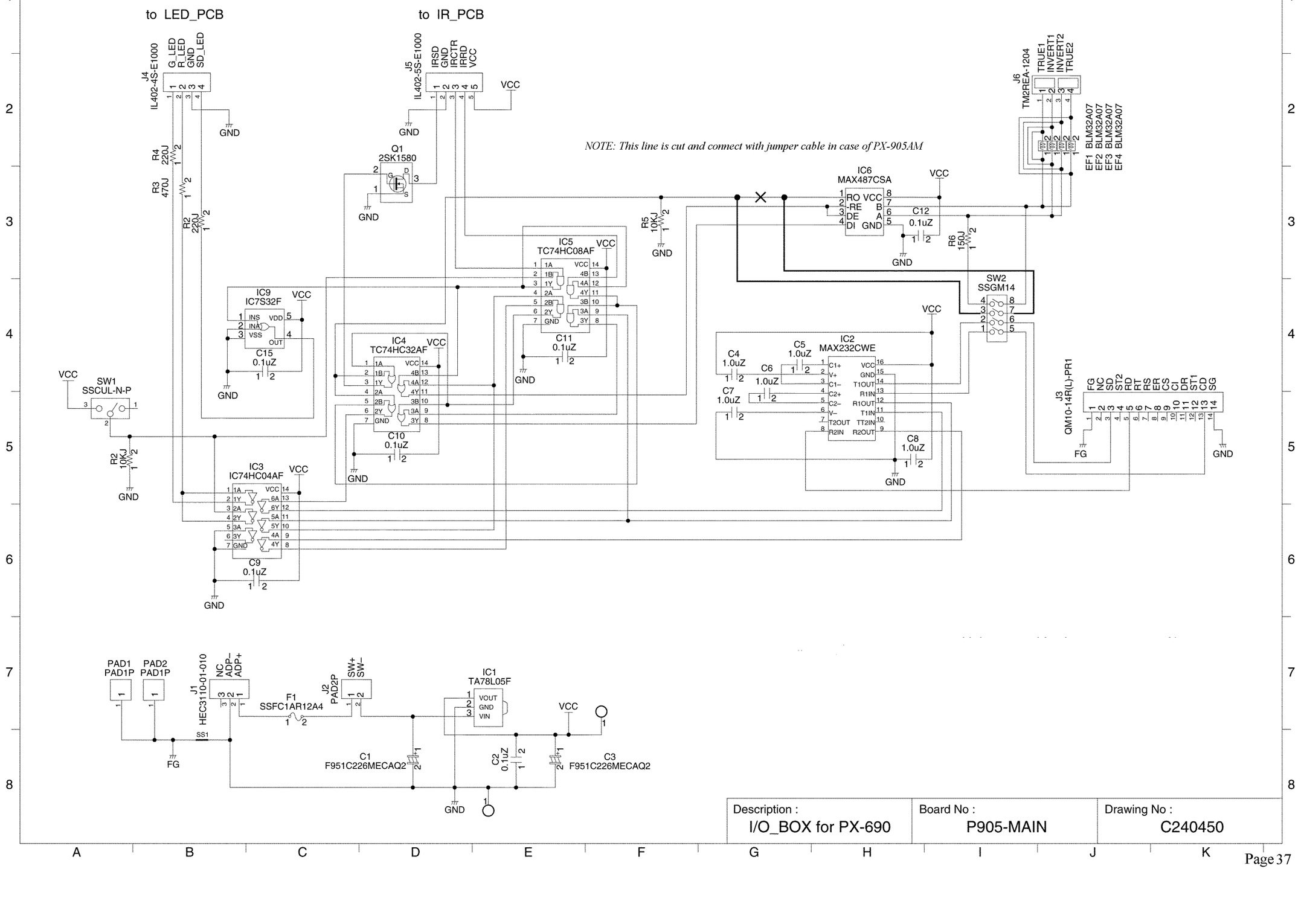
3. A method of connection



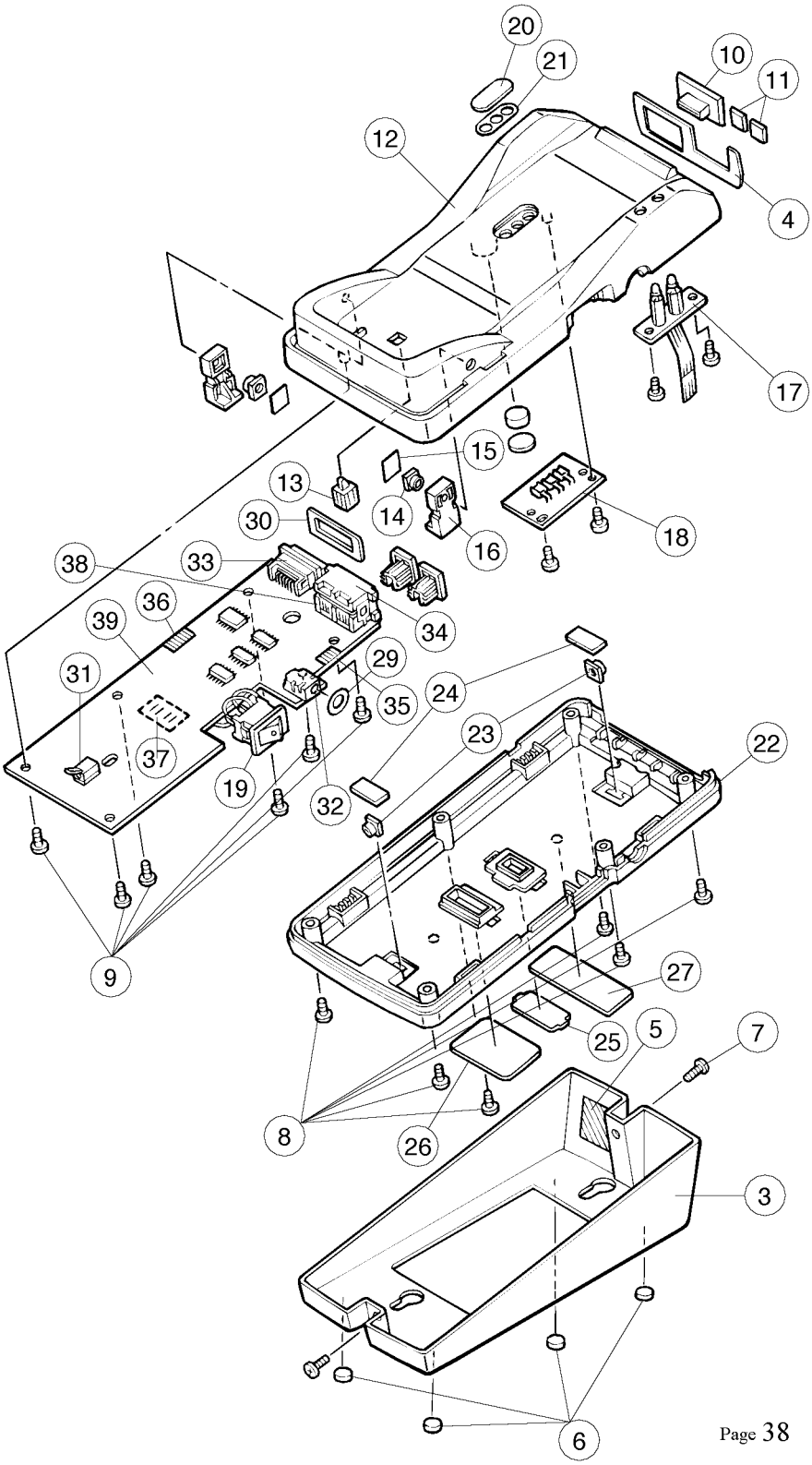
Dip Switch

Switch No.	Facility	On	Off	Default
SW 1	RS-232C	Used	Unused	Off
SW 2	RS-232C	Used	Unused	Off
SW 3	Unused			On
SW 4	Terminater	Terminater on	Terminator off	On

4. Circuit diagram



Description :	Board No :	Drawing No :
I/O_BOX for PX-690	P905-MAIN	C240450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N		Code No.	Parts Name	Specification	Version	Q	M	FOB Japan N.R. Yen Unit Price	Rank
	1. A figure of generalization								
	3	6513 1272	Wall hanging ass'y	C140025-1		1	5	140	C
N	4	6513 1314	Plate	C440123-1		1	20	43	C
N	5	6513 1328	Plate	C440125-1		1	20	39	C
	6	6335 7780	Rubber foot	A4911-3		4	100	4	C
	7	5860 9807	Screw	3X8 NI.....		2	100	3	C
	8	6333 3000	Screw	A33953-7		6	100	2	C
	9	6333 9680	Screw	A33953-9		6	100	2	C
	10	6513 2154	Dust cover A	C340239-1		1	10	50	B
	11	6513 2161	Dust cover B	C340240-1		2	10	50	B
	2. Upper case ass'y								
N	12	6513 1258	Upper case P905	C140023-1		1	1	240	C
	13	6513 1286	SW lever	C340118-1		1	20	30	B
	14	6512 9020	Nat	C413505-1		2	20	30	C
	15	6512 8780	Nat cover	C413397-1		2	50	10	C
	16	6513 1293	Nat holder	C340120-1		2	20	40	C
N	20	6513 1300	Filter	C440110-1		1	10	52	B
N	21	6513 1307	Tape	C440121-1		1	100	9	C
	3. Lower case ass'y								
	22	6513 1265	Lower case	C140024-1		1	5	150	C
	23	6512 9020	Nat	C413505-1		2	20	30	C
	24	6513 1349	Nat guide	C440130-1		2	20	20	C
	25	6513 1342	Plate C	C440129-1		1	20	30	C
	26	6513 1377	Plate D	C440148-1		1	20	30	C
N	27	6513 1405	Plate B	C440247-1		1	20	47	C
	4. Main P.C.B.								
N	28	6541 2285	P905-main-m ass'y	C240119*1		1	1	5,000	A
N	29	6513 1321	Filler plate B	C440124-1		1	50	15	C
	30	6513 1398	Filler plate RS	C440171-1		1	50	18	C
	31	3412 1295	Switch	SSCUL-N-P		1	10	98	C
	32	3501 5103	Adapter Jack	HEC3110-01-010		1	10	43	C
	33	3501 3934	Connector	QM10-14R(L)-PR1		1	1	620	C
	34	3501 9429	Modular connector	TM2REA-1204		1	5	220	C
	35	3501 8547	Connector 4P	IL402-4S-E1000		1	10	50	C
	36	3501 9422	Connector 5P	IL-402-5S-E1000		1	10	60	C
	37	3412 1442	Dip switch	SSGM14		1	5	180	C
	38	6513 2357	Spacer	Y410451-1		2	20	12	C
N	39	4304 1180	PCB-P905-Main	C140031-1		1	1	710	A
	C1,3	2895 2317	Chip capacitor	F951C226MECAQ2		2	10	25	C
	IC2	2105 4172	IC	MAX232CWE		1	10	100	B
	IC6	2105 4179	IC	MAX487CSA		1	10	100	B
	C2,C9-12,C15	2845 1540	Chip capacitor	MCH212F104ZK		6	20	4	C
	C4-8	2845 3563	Chip capacitor	MCH312F105ZK		5	50	18	C
	R1,5	2792 0831	Chip resistor	MCR10EZHJ103		2	100	3	C
	R6	2792 1183	Chip resistor	MCR10EZHJ151		1	100	4	C
	R3	2730 0523	Chip resistor	MCR10EZHJ471		1	100	9	C
	R2,4	2792 0815	Chip resistor	MCR10EZHJ221		2	100	3	C
	Q1	2254 0336	Chip transistor	2SK1580-T1B		1	20	28	C
	E1	3632 0343	Chip fuse	SSFC1AR12A4		1	10	92	A
	IC1	3665 0329	Voltage regulator	TA78L05F(TE12L)		1	10	62	B
N	IC5	2101 0642	MOS IC	TC74HC08AF-TP1		1	20	34	B
	IC3	2011 8806	MOS IC	TC74HC04AF-TP1		1	20	30	B
N	IC4	2101 0260	MOS IC	TC74HC32AF-TP1		1	20	36	B
	IC9	2101 1061	MOS IC	TC7S32F TE85L		1	10	27	B

OS Dump

To start OS Dump

1. DT-710

   Push [PW], [S-L] and [4] (Instead of [7])keys at same time.

   This modification is protected miss-operation.

2. DT-700

   Push [PW], [S-L] and [7] keys at same time.